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Choice Reaction Time Reaching Task for Non-human Primate

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We use this protocol and it's working

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Abstract

This protocol describes the behavioral task used with both healthy and MPTP-induced hemiparkinsonian non-human primates in the Turner Lab at the University of Pittsburgh, as well as the training procedure for introducing the task to naïve NHPs.

Materials

This task runs on the LabView software on the computer.

The LabView code for the task is provided on Zenodo at
<https://doi.org/10.5281/zenodo.11397909>

We need some hardware in addition to the software (listed below).

	Name	Product	RRID	Manufacture	Quantity	Link	Note
	LED	WP7113ID		Kingbright	2	https://www.digike.com/en/products/detail/kingbright/WP7113ID/1747663	These LEDs are used to show the location of reaching target to the subject. The color does not matter, but they need to be turned on with the TTL input. Manufacture and link are for exemplar LEDs
	Photoelectric sensor	GS5N		TAKEX	3	https://takex.com/us/photoelectric-sensors/mini-g-series	These sensors are used to detect subject's hand at the home-position and reaching target.
	Power supply	D15-05		Acopian	1	https://www.acopian.com/dual-pcb-5-10-12-15-m.html	This AC-DC power supply is used to provide power to the GS5N sensors.
	Task control software	LabView	SCR_014325	National Instruments	1	https://www.ni.com	
	Interface card	PXI-6224		National Instruments	1	https://www.ni.com	The LabView software need to receive the signal from sensor and send the TTL to turn on the LEDs and smootie pump. Therefore, we need to have an interface card with digital in and out between sensors/LEDs and computer. Product information is for an exemplar interface card.
	Peristaltic pump	Masterflex L/S		Avantor	1	https://www.avant	We added a relay circuit to the pump, allowing it



	Name	Product	RRID	Manufacture	Quantity	Link	Note
						orscience s.com/us/ en/applica tions/fluid - handling/ masterflex -ls-series	to be controlled by an external TTL pulse. Please note: This modification may void the product warranty.
	Relay	TQ2-L-5V		Panasonic Electric Works	1	https://www.digikemy.com/en/products/detail/panasonic-electric-works/TQ2-L-5V/251776	This is one exemplar relay circuit that we used to modify the peristaltic pump.

Before start

This protocol involves non-human primates. Therefore, all users must obtain prior approval from their Institutional Animal Care and Use Committee (IACUC) or an equivalent ethics committee before conducting any experiments described in this protocol.

Protocol for the subject (NHP)

- 1 Place hand on the home position.
Note: Successful placement is indicated by a buzzer linked to a photoelectric sensor at the home position.
- 2 Wait for the go-cue, which will be delivered by one of two LEDs in front of the subject.
- 3 Initiate a reach toward the LED once it turns on.
- 4 The target hold period begins when the subject reaches the target and activates the photoelectric sensor located there.
- 5 A small amount of smoothie is delivered if the subject successfully holds the target for a randomized duration.
- 6 Once reward delivery begins, the subject may return their hand to the home position to start the next trial.

Protocol for researchers training a naïve NHP

- 7 Use an arm restraint if you want the animal to use only one arm.
- 8 Place the smoothie delivery tubing near the animal's mouth.
- 9 Randomly turn on one of the two target LEDs.
- 10 Manually deliver smoothie immediately if the animal initiates or completes a reach toward the illuminated LED.
- 11 Once the animal associates reaching to LED with smoothie delivery, proceed to train the home-position capture.
- 12 Set the home-position hold period as short as possible.
Wait for the animal to accidentally activate the sensor at the home position.



Note: A buzzer linked to the photoelectric sensor helps the animal associate hand placement at the correct location with task initiation.

- 13 Gradually increase the delay intervals once the animal learns the basic sequence of the task.

Protocol references

National Research Council (U.S.). Committee for the Update of the Guide for the Care and Use of Laboratory Animals., Institute for Laboratory Animal Research (U.S.), National Academies Press (U.S.). Guide for the care and use of laboratory animals. Washington, D.C.: National Academies Press,, 2011, p. xxv, 220 p.